S/2..6/62/000/004/002/012
I003/I203

AUTHOR: Samsonov, G.V.

TITLE: Crystal chemical properties of sulfides of rare earth metals and actinides

PERIODICAL: Poroshkovaya Metallurgiya, no.4, 1962, 11-19

TEXT: Many of the above sulfides are already being used as refractory materials, and the use of many others in the electronic industry is very imminent. The bonds between the atoms of metal and sulfur in the crystal lattices of the actinide and lanthanide sulfides are believed to be ionic, while those between the atoms of sulfur are of a covalent nature. The physicochemical properties of the above compounds are profoundly influenced by the behavior of the f-and d-electrons of the transition metals. There are 3 figures and 5 tables.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Metal Powders and of Special Alloys of the AS UkrSSR)

Card 1/2

S/226/62/000/004/002/012
I003/I203

Crystal chemical properties...

SUBMITTED: January 15, 1962

Card 2/2

41899
S/226/62/000/004/008/012
1003/1203

15.2200

AUTHOR: Samsonov, G.V., and Shel'nikova, V.S.

TITLE: Electric resistance of refractory compounds at elevated temperatures

PERIODICAL: Poroshkovaya metallurgiya, no.4, 1962, 59-62

TEXT: There are either no data or only contradictory on the above subject, despite its great practical importance. The temperature dependence of the electric resistance of the carbides of titanium zirconium, hafnium, molybdenum, and tungten as well as of the borides of titanium and zirconium, up to 2300°C was investigated and some thermal coefficients calculated. The samples to be investigated were prepared by sintering metal powders. The relationship is discussed between the electric resistance and the behavior of the electrons of both the metallic and the non-metallic atoms of the above compounds. There are 2 figures and 1 table.

ASSOCIATION: Institut metallokeramiki i speciyal'nykh splavov AN USSR (The Institute

Card 1/2

S/226/62/000/004/003/012
I003/I203

Electric resistance of...

of Metal Powders and Special Alloys of the AS UkrSSR)

SUBMITTED: January 15, 1962

S/133/62/000/004/004/008
A054/A127

AUTHORS: Kocho, V.S.; Panasyuk, A.D.; Samsonov, G.V.; Strel'chenko, A.G.; Khabrunyak, I.G.

TITLE: Cermet tips made of zirconium boride for thermocouples used in the continuous measuring of liquid steel temperatures

PERIODICAL: Stal', no. 4, 1962, 317

TEXT: To develop a highly heat resistant material for thermocouple tips used in the continuous measuring of liquid steel temperatures in open hearth furnaces, tests were carried out in 1959 - 1960 at the Institut metallokeramiki AN UKrSSR (Institute of Cermets of the Academy of Sciences UKrSSR) with thermocouple tips made of zirconium boride. The tips, 120 mm in length, 11 mm O.D. and 4 mm I.D. were tested in 185-ton and 370-ton basic open-hearth furnaces into which they were placed by hand-operated thermocouples, equipped with blocks, 25 mm in diameter and 90 mm in length, made of reinforcement steel. The zirconium boride tips, which are more heat-resistant than those made of quartz, were immersed 10 - 11 times with the immersion time increased to 40 - 45 sec. To establish the service life of zirconium boride tips for continuous operation in

Card 1/2

SAMSONOV, G.V.(Kiyev); STRASHINSKAYA, L.V.(Kiyev); SHILLER, E.A.(Kiyev)

Contact interaction of metal-like carbides, nitrides, and borides with high-melting metals at high temperatures. Izv. AN SSSR Otd. tekh.nauk. Met. i topl. no.5:167-180 S-O '62. (MIRA 15:10)
(Ceramic metals)(Metals at high temperature)

45256

S/226/62/000/006/003/016
E039/E535

24.7100
24.7700

AUTHORS: Neshpor, V.S. and Samsonov, G.V.

TITLE: On the electron structure of silicides

PERIODICAL: Poroshkovaya metallurgiya, no.6 , 1962, 14-19

TEXT: The physical properties of the disilicides of the transition metals are studied; the results allow some general conclusions to be drawn on the electron structure and the nature of the interatomic bonds in silicides. The majority of the silicides of the transition metals possess metallic conductivity which is of the same order as the transition metals (10^3-10^4 Ω^{-1} cm^{-1}). These silicides also have an effective concentration of current carriers which is comparable with that in the metals 10^{22}-10^{23} cm^{-3}). An examination of the magnetic susceptibility of a number of silicides showed that many of them are diamagnetic and for those which showed paramagnetism it is significantly weaker than in the corresponding transition metals. Semiconductor properties have been found experimentally in the disilicides of chromium, iron, manganese, rhenium and barium. From qualitative estimates of the division of electron and hole conductivity the following ratio is

Card 1/2

obtained: $R/\rho = \sigma_h u_h - \sigma_e u_e$, which follows from the theory of conductivity and the Hall effect in solid bodies with two types of current carrier. Here R is the Hall constant; ρ is the specific electrical resistance; σ_h and σ_e the specific electrical conductivity possessed by holes and electrons and u_h and u_e the mobility of holes and electrons. An examination of this ratio for the investigated silicides of the transition metals having less than half filled d-shells shows that the electron conductivity is strengthened while in the case when the d-shell is more than half filled the hole conductivity is strengthened. There are 2 figures.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR
(Institute of Metalceramics and Special Alloys AS UkrSSR)

SUBMITTED: April 14, 1962

1 1600

42025
S/659/62/008/000/017/028
I048/I248

AUTHORS: Koval'chenko, M.S., and Samsonov, G.V.

TITLE: Viscous flow during the sintering of powders by the hot-compacting method.

SOURCE: Akademiya nauk SSSR. Institut metallurgii, Issledovaniya po zharoprochnym splavam. v.8. 1962. 116-126

TEXT: This is a discussion of the nature of processes causing the densification of various powdered materials during hot compacting, and the relationship of these processes to the viscous flow in crystalline substance; the sintering taking place during the hot compacting is considered to be a viscous flow phenomenon caused by the combined actions of external pressure and surface tension. A number of equations are derived, the most important being:

$$F(f) = Pt/4\eta \qquad (12)$$

for Newtonia bodies as glass, resins, etc., and

$$F(f) = \frac{P}{4\eta_o b} \ln (1+bt) \qquad (17)$$

Card 1/3

S/659/62/008/000/017/028
I048/I248

Viscous flow during the sintering...

for crystalline powders; the terms used are:

$$F(f) = \frac{5}{3}\ln(3-f) - \frac{1}{3}\ln f_o + \frac{5}{3}\ln(3-f_o) + \frac{1}{3}\ln f_o \quad [\text{equation 10}],$$

P is the external pressure, t is the time, η is the laminar viscosity coefficient of the sintered material, η_o is the viscosity at t=0, b is calculated from $b=(l^2-l_o^2)/l_o^2 t$, f is the porosity of the sintered material and f_o is f at t=0, l is the av. grain size of the material at the time t, and l_o is the initial grain size. Equation [12] agrees with the experimental data of J. Williams Symposium on powder metallurgy, 1954. Iron and Steel Inst., London 1956 . To determine the validity of equation 17 . WC powder (particle size 10 microns) was sintered at 2100-2500°C under pressures of 70-165 kg./sq.cm.; the F(f) - ln (1+bt) relationship was linear, and the variations U (the energy of "loosening" of the crystalline lattice) with temperature were small indicating that the deformation pro-

Card 2/3

S/659/62/008/000/017/028
I048/I248

Viscous flow during the sintering...

processes are governed by a diffusion mechanism. The viscosity of Cr_3C_2, calculated from the data of Hamjian and Lidman J. Metals, 5, 1953 is 1.93×10^{11}, 7.32×10^{10}, and 1.46×10^{10} g./cm.sec. at 1370, 1480, and 1590°C respectivoly; the data of the above authors agrees with the relationships revealed in this work. These relationships are valid only for non-reversible changes in the density; reversible changes occur during the hot sintering of certain porous polycrystalline substances such as Mo_2C, and the variations in density in this case are described by:

$$\Delta\rho/\rho_0 = \text{const.} e^{-t/\tau}$$

where $\Delta\rho/\rho_0$ is the relative reversible change in density, ρ_0 is the equilibrium density after relaxation, and τ is the time of relaxation calculated from $\tau = \tau_0 e^{U/RT}$, τ_0 being 6.99 sec. and U being 75000 cal./mole for Mo_2C within the temperature range 2000-2300°C. There are 6 figures and 3 tables.

Card 3/3

SAMSONOV, G.V. [Samsonov, H.V.]; SLEPTSOV, V.M. [Slieptsov, V.M.]

Preliminary variant of the diagram of the boron - silicon system. (MIRA 18:2)
Dop. AN URSR no.8:1066-1068 '62.

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.
2. Chlen-korrespondent AN UkrSSR (for Samsonov).

KISLYY, P.S.; L'VOV, S.N.; NEMCHENKO, V.F.; SAMSONOV, G.V.

Physical properties of the boride phases of chromium. Porosh. met. 2 no.6:50-53 N-D '62. (MIRA 15:12)

1. Khersonskiy gosudarstvennyy pedagogicheskiy institut imeni N.K.Krupskoy i Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

(Chromium boride—Testing)

36101

S/185/62/007/003/013/015
D299/D301

24.7700

AUTHORS: L'vov, S.M., Nyemchenko, V.P. and Samsonov, G.V.

TITLE: Electrical properties of titanium carbide-titanium nitride alloys

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 7, no. 3, 1962, 331 - 334

TEXT: The resistivity ρ, Hall coefficient R, thermo e.m.f. T and the thermal coefficient of resistivity C_0 of the system TiC-TiN, were measured. The study of the electrical properties of TiC-TiN alloys is important for ascertaining the influence (on these properties) of the relative concentration of C and Ni atoms (found in the same type of lattice) with different ionization-potential (11.24 and 14.51 ev., respectively). The alloys were prepared from powder mixtures, by hot pressing. The measurements were conducted by a method, given in the references. The obtained results are listed in 2 tables, together with the values of the effective concentrations n^* and the mobilities u^*, calculated by the pertinent formulas. The negative sign of the Hall coefficients and of the

...rences: 9

Card 1/3

38599
S/131/62/000/007/003/003
B117/B138

15.3240

AUTHORS: Samsonov, G. V., Semenov, Yu. N., Borodulin, P. Ya.

TITLE: Refractories on boron nitride base

PERIODICAL: Ogneupory, no. 7, 1962, 332-336

TEXT: The authors studied the possibility of producing boron nitride refractories by nitriding pressed pieces of boron carbide. Experiments in a nitrogen stream showed 1800-1900°C to be the best sintering temperature. After 2 to 3 hrs, the boron carbide was almost completely converted. The products contained 82-83% boron nitride and 17-18% graphite, almost the same as the calculated amounts. Porosity was 18-22%. Due to the low porosity the material after sintering, had not 2.2 times (as expected), but 1.3 times its initial volume. The new fine grained, gray material is strong (compressive strength at 20°C: 1000 kg/cm^2, bending strength: 200-230 kg/cm^2) and can easily be cut, sawn, or drilled. The coefficient of thermal expansion is low: $\alpha = 2.35 \cdot 10^{-6}$ to $3.92 \cdot 10^{-6}$ between 170 and 1070°C. Below 1500-1600°C, samples of porosity ~ 20% had high resistivity (determined on an MOM-4 (MOM-4) instrument) (at 20°C $\varrho = 2.5 \cdot 10^{12}$ ohm/cm,

Card 1/2

at 1550°C ($\varrho = 2.5 \cdot 10^5$ ohm/cm). Its variation with temperature was much slower than that of pure boron nitride. In vacuo (10^{-5} mm Hg) the boron nitride - graphite fusion evaporates more slowly than pure boron nitride (at 1500 ± 10°C (2.02 ± 0.15)·10^{-7} g/cm^2·sec) and oxidizes above 1000°C. Articles made of this new refractory have been used in the Institut metallurgii im. A. A. Baykova (Institute of Metallurgy imeni A. A. Baykov), in the Leningradskiy politekhnicheskiy institut (Leningrad Polytechnic Institute) and in the Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Powder Metallurgy and Special Alloys AS UkrSSR) to compare their refractoriness and chemical stability with those of fusions containing the silicides of transition metals, boron - silicon alloys (at 2000°C), of cryolite - aluminum melts (at 1000°C), borate and chloride melts (900°C). The new material has a better refractoriness than graphite, zirconium dioxide, and boron carbide and can be used for the production of aluminum for electrolizer linings, thermocouple sheathes, very pure metals and alloys for semiconductors, and also for machine parts working under low load in contact with agressive molten media. There are 3 figures and 1 table.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Powder Metallurgy and Special Alloys AS UkrSSR)

37167

S/078/62/007/005/005/014
B101/B110

15.2240
21.2500

AUTHORS: Samsonov, G. V., Kosolapova, T. Ya., Makarenko, G. N.

TITLE: Synthesis and physicochemical properties of yttrium carbides

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 7, no. 5, 1962, 975 - 979

TEXT: The yttrium carbides YC, Y_2C_3 and YC_2 were synthesized by heating Y_2O_3 with the corresponding stoichiometric amounts of carbon black in vacuo. YC is formed at 1800-1900°C; above 1700°C, the oxycarbide Y_2C_2O is first formed, which is converted into YC by liberation of CO on a further temperature increase (1900°C). YC melts above 1900°C under decomposition. Oxycarbides are also formed in the preparation of Y_2C_3 (1700-1800°C), but not in that of YC_2 (1900°C). Owing to the high volatility of YC and Y_2C_3, the pressure after the reaction remains higher than the initial pressure. YC_2, however, has low volatility. Samples were pressed from the carbides to test their physicochemical properties (YC at 1800°C, 80 kg/cm^2; Y_2C_3 at

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Synthesis and physicochemical ...

1650°C, 100 kg/cm^2; YC_2 at 2000°C, 100 kg/cm^2). The authors determined: (1) Microhardness (kg/mm^2); (2) melting point, °C; (3) thermal expansion coefficient, deg^{-1}; (4) resistivity, μohm·cm; (5) thermo-emf, paired with electrolytic copper, μv/deg; (6) radiation coefficient (λ = 0.655 mμ) at 1100°C; (7) ditto at 1800°C. The values in the given order are for YC: 120 ± 33; 1950 ± 20; $1.36 \cdot 10^{-6}$; $4.54 \cdot 10^4$; -34.6; 0.81; 0.81; for Y_2C_3: 900 ± 160; 1800 ± 50; -; $3.50 \cdot 10^2$; -6.4; 0.78; 0.91; for YC_2: 700 ± 106; 2300 ± 50; -; 88.7; -0.8; 0.87; 0.73. The radiation coefficient changes linearly in the given temperature range. The carbides are not stable at room temperature. Oxidation occurs, with YC and Y_2C_3 by formation of oxycarbides (increase in weight). YC_2 oxidizes more slowly and with decrease in weight. Yttrium carbides decompose easily in water and dilute alkalis or acids. YC_2 is the most stable. There are 5 figures and 3 tables. The most important English-language references are: F. Spedding, K. Schneider, A. Daane, J. Amer. Chem. Soc., 80, 4499 (1958); R. Vickery,

Card 2/3

Synthesis and physicochemical ... S/078/62/007/005/005/014
B101/B110

R. Siddacek, A. Ruben, J. Chem. Soc., 159, 498 (1959).

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov Akademii nauk USSR (Institute of Powder Metallurgy and Special Alloys of the Academy of Sciences UkrSSR)

SUBMITTED: June 12, 1961

Card 3/3

40053

S/089/62/013/002/010/011
B102/B104

26.2532

AUTHORS: Lashkarev, G. V., Samsonov, G. V.

TITLE: Characteristics of some high-melting compounds of transition metals as materials for thermoelectric converters

PERIODICAL: Atomnaya energiya, v. 13, no. 2, 1962, 187-188

TEXT: The use of high-melting compounds as thermoelements in thermogenerators offers a possibility of raising their efficiency $\eta_{tg} = \eta_t N$, where $\eta_t = (T_1 - T_0)/T_1$ and T_1 and T_0 are the temperatures of the hot and cold junctions, respectively. $N = (M-1)/(M + T_0/T_1)$, $M = \sqrt{1 + \frac{1}{2} z(T + T_0)}$; $z = \alpha^2/\varkappa\varrho$, α-thermo-emf, $\varkappa$-heat-conduction coefficient, ϱ- electrical resistivity. The authors made approximate calculations of z for T = 1200 and $T_0 = 400^\circ K$ for $MoSi_2$, CoSi, $NbSi_2$, ReSi, CrN, NbB_2, TiC, MnSi, $MnSi_2$, $ReSi_2$ and $CrSi_2$. MnSi-CrN were found to form optimum couples with $z = 3.5 \cdot 10^{-4}$ and $\eta = 6\%$. There are 1 figure and

Card 1/2

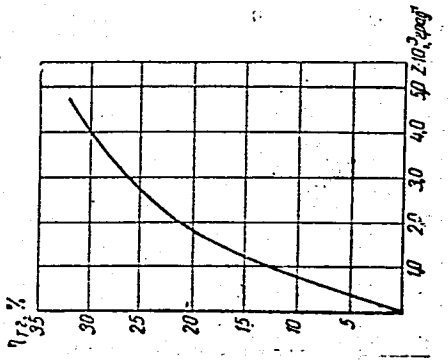
S/089/62/013/002/010/011
B102/B104

Characteristics of some high- ...

1 table.

SUBMITTED: September 25, 1961

Figure: η_{ltg} as dependent on $z \cdot 10^3$ in %/deg for $T_o = 400^\circ K$ and $T = 1200$.



Card 2/2

S/126/62/013/005/016/031
E202/E492

AUTHORS: Samsonov, G.V., Vaynshteyn, E.Ye., Paderno, Yu.B.

TITLE: Certain results of electrophysical and X-ray studies of rare earth hexaborides

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.5, 1962, 744-749

TEXT: Using 12 x 12.5 x 0.5 mm specimens cut by spark erosion from the respective hexaborides blanks, the authors measured the following properties: specific resistivity, Hall coefficient (extrapolating for the zero porosity), thermoelectric emf, temperature coefficient of resistance, concentration of the effective current carriers n^*, the mobility of current carriers u^* and an auxiliary quantity δ, related to Hall coefficient ($\delta = R/e^2$), expressing the magnitude of the fraction contributing to the conductivity carriers of both signs (i.e. $n_-u_-^2 - n_+u_+^2$). These data are summarized in a table. The electronic structure, distribution within the valency band and the magnitude of the charge on the metal were studied in some of these compounds by analysing the fine structure of the L_{II} and L_{III}.

Card 1/3

absorption X-ray spectra of barium and some rare earth elements in their oxides and hexaborides respectively. For this purpose, a focusing spectrograph was used working with the second order reflections from the 10$\bar{1}$1 of a bent quartz analyser. Dispersion within the working region was approximately 6 X mm^{-1} and the accuracy in the determination of the energy of the separate points of the fine structure absorption edges of the elements was of the order of 0.2 ev. The analysis of the absorption of the L-spectra in these compounds confirmed that the charge on the metal atom in all the rare earth hexaborides is 3, and on the barium atom 2. A considerable shift (5 ev) was observed in the L_{II} absorption spectrum of Ce in CeB_6, as compared with similar spectra of La or Ba, this was attributed generally to the change in the degree of screening of the terminal levels of the 2p-electrons transition in the process of L-absorption by the cerium atoms, but in the opinion of the authors this phenomenon is not fully accounted for, chiefly due to the lack of further experimental data. There are 4 figures and 1 table.

S/126/62/013/005/016/031
Certain results of electrophysical ... E202/E492

ASSOCIATIONS: Institut metallokeramiki i spetssplavov AN UkrSSR
(Institute of Cermets and Special Alloys AS UkrSSR)
Institut neorganicheskoy khimii SO AN SSSR
(Institute of Inorganic Chemistry SO AS USSR)

SUBMITTED: August 1, 1961

Card 3/3

24520

41525
S/126/62/014/003/022/022
E193/E383

AUTHORS: Samsonov, G.V. and Epik, A.P.

TITLE: Concerning the problem of the parameters of reactive diffusion of boron and carbon in refractory transition metals

PERIODICAL: Fizika metallov i metallovedeniye, v. 14, no. 3, 1962, 479 - 480

TEXT: Inaccuracies have been detected in an earlier work of G.V. Samsonov and V.P. Latysheva (FMM, 1956, 2, 309) in the values of the activation energy for diffusion (Q) and the pre-exponential factor (D_o) quoted for the diffusion of carbon and boron in titanium, zirconium, niobium, tantalum, molybdenum and tungsten. The present authors obtained correct values of these parameters which not only confirmed the previously reached conclusions on the nature and mechanism of the processes associated with diffusion of carbon and boron in the transition metals but also made it possible to formulate an explanation of the values of D_o in the expression for the temperature-dependence of the

Card 1/2

Concerning the problem ....

diffusion coefficient. Analysis of the relationship between Q and D_o on the one hand, and an index 1/Nn on the other (n is the number of electrons at the d-level, N denoting the basic quantum number of this level) showed that in the case under consideration the diffusion parameters did not depend on the atom size of the diffusing elements. The values of Q and D_o are determined exclusively by the deficiency in electrons at the d-level of the transition metals and by the ease with which boron and carbon give up their valence electrons to the electron gas. There are 1 figure and 1 table.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR (Institute of Powder Metallurgy and Special Alloys of the AS UkrSSR)

SUBMITTED: May 13, 1962

Card 2/2

S/125/62/000/002/004/010
D040/D113

AUTHORS: Pen'kovskiy,V.V.; Samsonov,G.V.

TITLE: Electrodes of refractory compounds for underwater oxy-electric steel cutting

PERIODICAL: Avtomaticheskaya svarka, 15 no.2, 1962, 39-43

TEXT: Highly durable tubular electrodes of titanium carbide with a stabilizing coating have been developed for underwater steel cutting and tested by the TsNIIsvyazi Ministerstva Svyazi SSSR (Central Scientific Research Institute of Communications, Ministry of Communications of the USSR). Information on the experiments in which the new electrodes were produced, and on all electrode and coating materials experimented with, is given. The experiments were conducted in view of the very high consumption of existing underwater-cutting electrodes which have to be replaced too frequently and cause various difficulties. The electrode design (Figure) is the conventional one for cutting by the oxy-electric method in which metal is melted by electric arc and blown off by a jet of oxygen from the duct in the electrode. Tubular electrodes, containing refractory carbides and borides, and compounds of silicon and boron carbides,

Card 1/ 2

Electrodes of refractory compounds ...

were produced. The diameter of the electrodes was 9-10 mm and the length 250 mm. Tubular blanks were produced from powders mixed with bakelite varnish or with starch paste and extruded through a die by a method previously described (Ref.7: Samsonov, G.V., Kisliy, P.S., Dopovidi AN URSR, no.1, 46, 1959), cut to lengths, and then dryed and sintered in an induction furnace. Sintered tubes were coated with boron nitride or silicon nitride-base coatings, as well as a compound of the formula $Si_xC_yO_z$ called "siloksikon". The coating permits maintaining stable arc burning through sublimation and dissociation of Si_3N_4 and BN, and forming a shielding nitrogen atmosphere around the electrode end. Potassium ferrocyanide was added to increase ionization. All electrode types were tested underwater in the Malaya Neva river by cutting 10 and 15 mm plates of Ст.3 (St.3) steel by the conventional method. Electrodes of titanium carbide were evidently the best and 6 to 10 times more durable than the ЭПР-1 (EPR-1) metal electrodes. With all titanium carbide electrodes, the arc excitation was easy, the arc burning steady, the cuts clean and the quantity of slag insignificant. The authors thank M.M.Aleksandrov, N.M.Madatov and S.G.Agroskin for assistance in experiments. A.I. Chernenko, G.V. Samsonov and A.I. Shlyamin are mentioned. There is 1 figure and 9 references; 8 Soviet and 1 non-Soviet-bloc.

Card 2/2 Inst. Metal Ceramics & Special Alloys AS UKr SSR

SAMSONOV, G.V.

Aluminothermic smelting of ferroboron from colemite outside the furnace. Analele metalurgie 16 no.2:95-107 Ap-Je '62.

SAMSONOV, G.V.

Refractory compounds; their properties, extraction and role in modern technics. Analele metalurgie 16 no.3:104-131 Jl-S '62.

KOCHO, V.S.; PANASYUK, A.D.; SAMSONOV, G.V.; STREL'CHENKO, A.G.; KHAVRUNYAK, I.G.

Ceramic metal tips made of zirconium boride for thermocouples in the continuous measurement of liquid steel temperature. Stal' 22 no.4:317 Ap '62. (MIRA 15:5)
(Thermocouples) (Zirconium boride)

SAMSONOV, G.V.

Conference of the "Ogneupory" journal readers in Kiev. Ogneupory 27 no.3:148 '62. (MIRA 15:3)

1. Institut metallokeramiki i spetsial'nykh splavov AN USSR.
(Refractory materials--Periodicals)

SAMSONOV, G.V.; SEMENOV, Yu.N.; BORODULIN, P.Ya.

Refractory on a boron nitride basis. Ogneupory 27 no.7:332-335 '62. (MIRA 15:8)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.
(Boron nitride) (Refractory materials)

VEREYKINA, L.L.; SAMSONOV, G.V.

Preparation and chemical properties of chromium phosphide.
Ukr.khim.zhur. 28 no.4:441-443 '62. (MIRA 15:8)

1. Institut metallokeramiki i spetsial'nykh splavov AN USSR.
(Chromium) (Phosphides)

SAMSONOV, G.V.; RADZIKOVSKAYA, S.V.

Preparation of praseodymium and neodymium sulfides. Ukr.khim. zhur. 28 no.4:444-445 '62. (MIRA 15:8)

1. Institut metallokeramiki i spetsial'nykh splavov AN USSR.
(Praseodymium sulfide) (Neodymium sulfide)

KOSOLAPOVA, T.Ya.; SAMSONOV, G.V.

Chemical stability of chromium carbides. Ukr.khim.zhur. 28 no.8:931-933 '62. (MIRA 15:11)

1. Institut metallokeramiki spetsial'nykh splavov AN UkrSSR.

(Chromium carbide)

S/074/62/031/012/001/001
B117/B186

AUTHOR: Samsonov, G. V.

TITLE: Chemistry of silicides of rare-earth metals

PERIODICAL: Uspekhi khimii, v. 31, no. 12, 1962, 1478 - 1495

TEXT: This is a review paper of information in Western and Soviet publications on the silicides of rare-earth metals, covering the period from 1934 to 1962. The subjects are: Structure and properties; production methods such as (a) direct combination of rare-earth metals and silicon, (b) reduction of oxides of rare-earth metals with silicon, (c) electrolysis of melted media; silicides of Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Dy, Yb. According to the physical and chemical properties, the following possible applications of the silicides in question have been considered: in nuclear power engineering, as material (either pure or as additive to alloys) for various structural parts capable of absorbing neutrons; in the manufacture of dosimeters and counters; in semiconductive material to be used at high temperatures or in aggressive media; in metallurgy as deoxidizing agents; as a sort of binder to introduce rare-earth metals into some types of glass; as nonscaling component for heat resistant

Card 1/2

Chemistry of silicides of ... S/074/62/031/012/001/001
B117/B186

alloys. There are 12 figures, 11 tables, and 33 references.

ASSOCIATION: In-t metallokeramiki i spets. splavov AN USSR (Institute of Powder Metallurgy and Special Alloys AS UkrSSR)

Card 2/2

S/079/62/032/009/001/011
I048/I242

AUTHORS: Samsonov, G.V., Kosolapova, T.Ya., and Fedorus, V.B.

TITLE: Preparation of barium carbide

PERIODICAL: Zhurnal obshchey khimii, v. 32, no. 9, 1962, 2753-2755

TEXT: The following reactions leading to the formation of BaC_2 were investigated: (1) $BaO + 3C = BaC_2 + CO$ (2) $BaO_2 + 4C = BaC_2 + 2CO$ (3) $BaCO_3 + 3C = BaC_2 + CO$. When a mixture of $BaO + 3C$ was heated to 1000-1500°C no BaC_2 was formed because of the evaporation of BaO. On heating sintered bricks of $BaO_2 + 4C$, a reaction started at 1300°C, yielding a product with 2.22% combined C; the product formed at 1600°C contained 11.79% combined C, but the amount of combined C decreased when the reaction temperature was increased further. The weight losses increased with increasing reaction temperature up to 80-90% at 1800-1900°C. The yield of BaC_2 was 10-15%. Reaction (3), after 4 hours of heating at 1350°C, yielded a product containing 12.2% combined C; the presence of excess C (in the form of soot) had an irregular effect on the course of the reaction. In the presence

S/079/62/032/009/001/011
I048/I242

Preparation of barium...

of 5% excess C, a product containing 14% combined C (i.e., with a composition approximately equal to the stoichiometric composition of BaC_2) was formed at 1350°, but the amount of combined C decreased with further increase in the amount of excess C. Both CO and CO_2 were found in the gaseous products of the reaction; this shows that the rate of dissociation of $BaCO_3$ at the experimental temperature used was higher than the rate of the reaction $CO_2 + C \rightleftarrows 2CO$. There are 3 tables.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov Akademii nauk Ukrainskoy SSR (The Institute of Metal Ceramics and Special Alloys, Academy of Sciences of the UkrSSR)

SUBMITTED: September 23, 1961

Card 2/2

34967
S/080/62/035/002/001/022
D204/D302

5.2400

AUTHORS: Samsonov, G. V., Vereykina, L. L. and Titkov, Yu. B.

TITLE: The preparation of gallium phosphide

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 2, 1962, 242-245

TEXT: A brief mention is first made of the potential uses of gallium phosphide, basing the suggestions on the semi-conductive and thermoelectric properties of this compound. The older methods are considered to be inconvenient technologically. In the present work the authors prepared GaP by the reaction $Ga_2O_3 + 2PH_3 = 2GaP + 3H_2O$. The apparatus was earlier described by Samsonov et al. (Ref. 5: ZhNKh, 5, 1888, (1960)). Ga_2O_3 was prepared by dissolving 99.99% Ga in conc. HNO_3 and decomposing the nitrate. The oxide contained $\sim 10^{-3}$% Cu, $< 10^{-2}$% Pb and $< 10^{-3}$% Sn. Temperature and the time of interaction were varied between 600 - 950°C and 1 - 9

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The preparation of gallium ...

hours respectively. The products were analyzed for unreacted Ga_2O_3 and chemically combined metal and phosphorous. The method of analysis is described. GaP was found to be insoluble in boiling water or in 1:1 HCl and 1:1 H_2SO_4, but dissolved readily in 1:1 HNO_3 and in alkalis on warming. It was found that at 750°C the yield of GaP increased linearly from ~30% after 1 hour to ~90% after 9 hours, while ~100% yields were obtained after 9 hours at 850°C and after 1 - 3 hours at 950°C. 3 - 5 hours at 950°C are therefore recommended, using 6 moles PH_3/mole Ga_2O_3. The phosphide was found to be cubic (sphalerite type) with a equal to 5.45 Å. It contained $< 10^{-3}$% of Fe and Pb and $\sim 10^{-3}$% Cu. Material of greater purity is believed to be easily attainable. There are 1 figure, 1 table and 12 references: 6 Soviet-bloc and 6 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: Mining J., 254, 133, (1960); D. Effer and C. R. Antell, J. Electrochem. Soc., 107, 110, (1960); A. Addamiano, J. Am. Chem. Soc., 82, 1537, (1960); A. Addamiano, Acta Cryst., 13, 505, (1960).

Card 2/3

SAMSONOV, G.V.; SINEL'NIKOVA, V.S.

Preparation and properties of titanium aluminides. TSvet. met. 35 no.11:92-95 N '62. (MIRA 15:11)
(Titanium compounds)

SAMSONOV, G.V.; LYUTAYA, M.D.

Preparation of cerium nitride. Zhur.prikl.khim. 35 no.11:2359-2362 N '62. (MIRA 15:12)

1. Institut metallokeramiki i spetssplavov AN UkrSSR.
(Cerium nitride)

34752
S/020/62/142/003/019/027
B106/B110

15.2600
15.2240

AUTHORS: Samsonov, G. V., and Verkhoglyadova, T. S.

TITLE: Physical properties of nitrides of transition metals

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 3, 1962, 608 - 611

TEXT: In continuation of a systematic study of electrical properties and hardness of the nitrides of transition metals, the authors determined electrical resistivity, thermo-e.m.f., Hall effect, microhardness, thermal conductivity, and melting point of titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, and molybdenum nitrides. They nitrided metals into nitrides excluding the possibility of oxygen impurities and simultaneous or subsequent sintering in a nitrogen atmosphere. Samples of various porosities were used for measurements which were extrapolated for zero porosity (for electrical properties according to a formula by V. I. Odelevskiy (Ref. 6: ZhTF, 21, 667 (1951)) for thermal conductivity according to the formula of Ref. 7 (see below))). Table 1 shows the results of measurement. All nitrides studied except for vanadium, niobium, and molybdenum nitrides, mainly show n-type conductivity. Thermo-e.m.f.

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coefficients increase almost linearly as the receptivity of empty d-shells increases, which can be estimated from the ratio 1/Nn (N = main quantum number of incompletely filled d-shells; n = number of electrons in it). The electrical resistivity of the nitrides in question decreases with decreasing degree of d-shell filling. This fact, together with the character of the change of thermo-e.m.f. coefficients indicates an increasing number of transitions of valence electrons of nitrogen into the d-shells of metal atoms under formation of spd-hybrid conditions and reduction of the polarization degree of the metal - nitrogen bond. The decrease of the electrical resistivity with increasing nitrogen content in the systems V - N, Nb - N, and Ta - N corresponds to the decrease of the ion bond portion. The thermal conductivity decreases as the portion of ion bonds increases. Experimental data on the thermal conductivity of all nitrides studied, except tantalum and chromium nitrides, agree more or less with the values calculated for n-type conductivity. As to tantalum and chromium nitrides, the values measured exceed by far those obtained by calculation. This suggests predominant thermal conductivity of the crystal lattices of these nitrides. The results of microhardness measurements confirm the assumption of A. M. Belikov and Ya. S. Umanskiy (Ref. 15:

Physical properties of nitrides...

Nauchn. dokl. vyssh. shkoly, no. 1, 192 (1958)) on the weakening of the Me-Me cohesive forces during the penetration of nonmetallic atoms into the crystal lattices of metals. For the nitride phases Me_2N, the Me-Me bond remains predominant, whereas the weaker Me-N bond prevails in MeN phases. This is also confirmed by higher melting points of Me_2N phases.

In conclusion it is assumed that transition metals of group IV whose d-shells are almost empty, combine with hardly ionizable nitrogen into nitrides with a prevailing number of metal bonds. An energy gap appears between the sd-states of metals and p-states of nitrogen as the nitrogen content decreases in the homogeneous regions of these phases. This causes semiconducting properties. In the nitrides of the transition metals of groups V and VI whose d-shells are filled to a larger extent, the portion of ion bonds is higher, the homogeneous regions are smaller, and an hexagonal structure of mononitrides stabilizes. Stable Me_2N nitrides form.

The semiconducting character of mononitrides increases as the degree of d-shell filling increases. As to chemical bonds in nitride lattices, the previous assumption (Ref. 1: G. V. Samsonov, Zhurn. strukturn. khim., 1, 447 (1960)) that titanium, zirconium, hafnium, and vanadium nitrides mainly

have metal bonds, whereas molybdenum and apparently also tungsten nitrides mainly have ion bonds. Both, metal and ion bonds occur in niobium, tantalum, and chromium nitride lattices. Ion bonds, however, are slightly predominant. There are 2 figures, 2 tables, and 15 references: 14 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: J. Vasilos, W. Kingery, J. Am. Ceram. Soc., 37, 409 (1954).

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov Akademii nauk USSR (Institute of Powder Metallurgy and Special Alloys of the Academy of Sciences UkrSSR)

PRESENTED: September 2, 1961, by A. N. Frumkin, Academician

SUBMITTED: August 21, 1961

Table 1. Physical properties of the nitrides of transition metals.

Legend: (1) nitride; (2) nitrogen content; (a) % by weight; (b) atom%; (3) coefficient of thermo-e.m.f. (abs)α, μv/degree; (4) electrical resistivity, ϱ, μ ohm·cm; (5) Hall coefficient, R, cm^3/coul; (6) thermal

34481
S/020/62/142/004/018/022
B101/B110

15.2240

AUTHORS: Samsonov, G. V., Verkhoglyadova, T. S., L'vov, S. N., and Nemchenko, V. F.

TITLE: Effect of oxygen on the electric properties of titanium nitride

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 4, 1962, 862 - 865

TEXT: The electric properties of TiN, in the lattice of which N was stepwise substituted by O, were investigated. The TiN - TiO melts were obtained by treating a mixture TiO_2 + Ti for 4 hr with NH_3 at 800°C (reduction of TiO_2) and 4 hr at 1300°C (formation of TiN and solid solutions of TiN + TiO). Metallographic investigation and X-ray diffraction proved that the melts were monophase. The electric properties changing with the TiO content were:

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Effect of oxygen on the...

Mole%		I	II	III	Mole%		I	II	III
TiN	TiO				TiN	TiO			
100	0	26	-0.67	-9.3	62.7	37.3	12.7	-1.36	-8.6
90	10	17.9	-0.4	-7.1	47.6	52.4	14.2	-1.64	-
79.6	20.4	13.1	-0.17	-6.4	46.7	53.3	-	-1.70	-13.4
73.1	26.9	11.3	-0.48	-0.75	46.0	54.0	14.3	-2.02	-
65.0	35.0	12.1	-0.82	-	41.8	58.2	27.0	-2.64	-

I = electric resistivity, μohm·cm; II = Hall coefficient $R \cdot 10^4$, cm^3/coulomb; III = coefficient of thermo-emf, μv/deg. The course of the electric resistance points to a superimposition of two factors: at low O content, the effect of its lower ionization potential, as compared with N, predominates; at high O content, the effect of the larger atom radius, as compared with N, predominates, thus reducing the overlapping of energy bands, and increasing the lattice spacing. All melts investigated showed reversal of the sign of the temperature coefficient of the electric resistance (Fig. 4) when a certain temperature was reached. The earlier passage through the maximum for melts rich in TiO is caused by the geometric factor: the larger radius of the oxygen ion. The pointed

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maxima correspond to the preponderant effect of one of the two nonmetals, the flat maxima correspond to the combined action of both nonmetals. Similar electric properties are assumed for the systems ZrN - ZrO, and HfN - HfO. There are 4 figures, 2 tables, and 6 references: 4 Soviet and 2 non-Soviet. The reference to the English-language publication reads as follows: A. Münster, K. Sagel, G. Schlamp, Nature, 174, 1154 (1954).

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov Akademii nauk USSR (Institute of Powder Metallurgy and Special Alloys of the Academy of Sciences UkrSSR). Khersonskiy pedagogicheskiy institut im. N. K. Krupskoy (Kherson Pedagogical Institute imeni N. K. Krupskaya)

PRESENTED: September 14, 1961, by G. V. Kurdyumov, Academician

SUBMITTED: September 1, 1961

38612
S/020/62/144/005/009/017
B106/B138

21.2500
15.2240

AUTHORS: Samsonov, G. V., Makarenko, G. N., and Kosolapova, T. Ya.

TITLE: Scandium carbide and composite carbides of scandium and titanium

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 5, 1962, 1062-1065

TEXT: Scandium carbide phases were produced by reducing scandium oxide with carbon at high temperatures. In contrast to the published methods (R. Vickery, R. Sedlaček, A Ruben, J. Chem. Soc., 159, 503 (1959); H. Auer-Welsbach, H. Nowotny, Monatshefte f. Chemie, 92, 198 (1961)) the layers were heated in vacuo with the gaseous products being pumped off continuously. Carbide formation sets in at 1300-1400°C. In the reduction products, the bound carbon content, increases as the temperature rises without, however, reaching the calculated ScC value until 1900°C. At 1900-2000°C, the reaction mass dissolves completely, and Sc + C_{total} ≈100%. The bound C content is somewhat higher than that of pure ScC. Not even a change in conditions (temperature, heating time) yielded <ScC of the theoretical composition. Under certain conditions, ScC was formed via

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B106/B138

Scandium carbide and composite ...

metallic scandium. The carbide phase obtained has a cubic face-centered NaCl-type lattice with a = 4.53. This cubic scandium carbide phase has a tendency to absorb oxygen with formation of oxycarbides, to dissolve carbon, and to undergo similar effects due to the extraordinarily high unsaturation of the d-shell in the scandium atom. This is confirmed by the high microhardness of the solid solutions of scandium carbide and isomorphous titanium carbide (Table 1) obtained by the reduction of Sc_2O_3 + TiO_2 mixtures with carbon in vacuo. The optimum composition of the solid solutions of these two carbides corresponds to a particular electron density distribution in the lattice of the solid solutions and to a particular degree of overlapping of the 3d-level of titanium and scandium. The decrease in the specific conductivity of ScC-TiC solid solutions with increasing TiC content also suggests overlapping of the d-level during the formation of solid solutions. The thermal expansion coefficient of ScC($11.4 \cdot 10^{-6}$) decreases considerably when 20 mole% TiC is dissolved. However, if the TiC content is further increased, the thermal expansion coefficient remains practically constant and very close to that of TiC. The results obtained openup new possibilities for using scandium carbide to improve the hardness of the carbides of other transition metals,

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VINOGRADOV, Gleb Andreyevich, kand. tekhn. nauk; RADOMYSEL'SKIY, Izrail' Davidovich, kand. tekhn. nauk; SAMSONOV, G.V., retsenzent; PILIPENKO, Yu.P., inzh., red.; GORNOSTAYPOL'SKAYA, M.S., tekhn. red.

[Pressing and rolling ceramic metal materials] Pressovanie i prokatka metallokeramicheskikh materialov. Moskva, Mashgiz, 1963. 198 p. (MIRA 16:5)

1. Chlen-korrespondent Akademii nauk Ukr. SSR (for Samsonov).
(Ceramic metals)

PHASE I BOOK EXPLOITATION SOV/6460

Samsonov, Grigoriy Valentinovich

Tugoplavkiye soyedineniya; spravochnik po svoystvam i primeneniyu (Refractory Compounds; Handbook on Properties and Uses) Moscow, Metallurgizdat, 1963. 397 p. 6300 copies printed.

Reviewers: A. N. Krestovnikov, Professor, Doctor of Technical Sciences; V. F. Ormont, Professor, Doctor of Chemical Sciences; and M. Yu. Bal'shin, Candidate of Technical Sciences. Ed.: I. I. Ol'khov, Ed. of Publishing House: M. S. Arkhangel'skaya. Tech. Ed.: P. G. Islent'yeva.

PURPOSE: This handbook is intended for scientific research workers, production engineers, designers, and personnel in plant laboratories. It may also be of interest to the personnel of planning organizations, and to students at schools of higher education.

Card 1/8

COVERAGE: The handbook contains a scientific classification of refractory compounds and systematically arranged information on crystallochemical, thermal, thermochemical, electric, magnetic, optical, and refractory properties of borides, carbides, nitrides, silicides, phosphides, and sulfides of metals, as well as of nitrides, carbides, and phosphides of boron, silicon and boron-silicon alloys. The book furnishes information on main fields of application of refractory compounds in the metallurgical, chemical, and machine industries, power engineering, automation, and radio and electrical engineering, and includes the most recently developed phase diagrams of systems in which refractory compounds are formed. No personalities are mentioned. There are 1108 references, one-third of which are Soviet.

TABLE OF CONTENTS:

YEREMENKO, V.N., otv. red.; FRANTSEVICH, I.N., red.; SAMSONOV, G.V., red.; PISARENKO, G.S., red.; FEDORCHENKO, I.M., red.; TRESVYATSKIY, S.G., red.; IVASHCHENKO, Yu.N., red.; POKROVSKAYA, Z.S., red.

[Surface phenomena in melts and processes of powder metallurgy] Poverkhnostnye iavleniia v rasplavakh i protsessakh poroshkovoi metallurgii. Kiev, Izd-vo AN USSR, 1963. 456 p. (MIRA 18:1)

1. Akademiya nauk URSR, Kiev. Institut metallokeramiki i spetsial'nykh splaviv. 2. Institut metallokeramiki i spetsial'nykh splavov AN Ukr.SSR (for Ivashchenko, Yeremenko)

ACCESSION NR: AT4035158 S/0000/63/000/000/0008/0021

AUTHOR: Samsonov, G. V.; Kosolapova, T. Ya.; Lyutaya, M. D.; Makarenko, G. N.

TITLE: Preparation and physicochemical properties of the carbides and nitrides of the rare-earth elements

SOURCE: AN SSSR. Institut geokhimii i analiticheskoy khimii. Redkozemel'ny*ye elementy* (Rare-earth elements). Moscow, Izd-vo AN SSSR, 1963, 8-21

TOPIC TAGS: rare earth, rare earth element, scandium, lanthanum, yttrium, cerium, carbide, nitride

ABSTRACT: After reviewing the literature on the structure and physical properties (density, melting point, electrical resistivity) of the carbides and nitrides of Sc, Y, La and Ce, the authors describe the preparation of ScC, YC, LaC, ScN, CeN and LaN, the oxidation of the carbides, and some results of an X-ray study of their microstructure. The carbides and nitrides were prepared by heating the oxides with C and N, respectively, at temperatures between 800 and 1800C. The nitrides could also be prepared at lower temperatures by heating the oxide with ammonia. Data are given on the effects of variations in temperature, heating rate and concentration of the reagents, as well as on the relationship between the composition and physical properties of the carbides. Thus, YC_2 was found to have the highest

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ACCESSION NR: AT4035158

melting point, electrical resistivity, chemical stability and microhardness, all of which increased with the C/metal ratio. X-ray analysis of the nitrides showed a cubic lattice of the NaCl type with a period of about 4.5-5.5 A. "The X-ray analyses were carried out by O. T. Khorpyakov." Orig. art. has: 12 figures and 6 tables.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii AN SSSR (Institute of Geochemistry and Analytical Chemistry, AN SSSR)

SUBMITTED: 31Oct63 DATE ACQ: 30Apr64 ENCL: 00

SUB CODE: IC NO REF SOV: 016 OTHER: 005

Card 2/2

TRANSLATION FORCE SERVICE 2070

ACCESSION NR: AT4035159 S/0000/63/000/000/0022/0035

AUTHOR: Samsonov, G. V.; Neshpor, V. S.; Paderno, Yu. B.

TITLE: Preparation and properties of the silicides of some rare-earth elements

SOURCE: AN SSSR. Institut geokhimii i analiticheskoy khimii. Redkozemel'ny*ye elementy* (Rare-earth elements). Moscow, Izd-vo AN SSSR, 1963, 22-35

TOPIC TAGS: rare earth element, rare earth, silicide, silicon, lanthanum, cerium, yttrium, neodymium, scandium

ABSTRACT: The reaction between silicon and the oxides of lanthanum, cerium, yttrium, neodymium and scandium:

$$Me_2O_3 + 7Si = 2MeSi_2 + 3SiO \quad (Me = Sc, Y, La, Nd), \qquad (1)$$

$$CeO_2 + 4Si = CeSi_2 + 2SiO,$$

$$Sc_2O_3 + 5Si = 2ScSi + 3SiO,$$

was investigated in a vacuum at high temperatures by determining the relationship between SiO vapor pressure and reaction time at gradually increasing temperatures. The variations

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ACCESSION NR: AT4035159

in SiO pressure at different reaction temperatures and the variation in the chemical composition of the reaction products are also tabulated. In the case of La_2O_3, as the reaction temperature increases, the amount of free silicon continuously decreases and becomes zero at 1600C. At the same time, the lanthanum content amount of bound silicon become close to the theoretical for $LaSiO_2$. X-ray diffraction patterns of the reaction products show that at 1100-1400C LaSi and $LaSi_2$ are formed, while at higher temperatures $LaSi_2$ is formed directly. X-ray analysis of the other reaction products showed that monophase $CeSi_2$ and $PrSi_2$ were formed. At 1200-1500C, YSi is formed rather than YSi_2; over the temperature range 1200-1400C, the x-ray diagrams show lines of yttrium oxide and free silicon, the intensity of which weakens with increasing temperature. The composition of the silicide corresponding to the product containing no free silicon (obtained at 1500C) can be written $YSi_{1.4}$. Theproduct thus contains some disilicide in addition to monosilicide. The chemical composition of the reaction products of neodymium oxide with silicon at different temperatures shows that $NdSi_2$ is formed at a relatively low temperature, but that the reduction is not complete; on the x-ray diagrams, ND_2O_3 lines can be seen up to 1500C. The products obtained at 1470 and 1580C are not homogeneous. Gadolinium disilicide was prepared at 1000-1800C in a vacuum, and the possible preparation of scandium silicides ScSi and $ScSi_2$ was investigated. Data are also given on the crystalline structure,

ACCESSION NR: AT4035159

microhardness, thermal stability and electrical properties of the rare-earth silicides. Orig. art. has: 14 figures and 3 tables.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii AN SSSR (Institute of Geochemistry and Analytical Chemistry AN SSSR)

SUBMITTED: 31Oct63 DATE ACQ: 30Apr64 ENCL: 00

SUB CODE: IC NO REF SOV: 008 OTHER: 014

Card 3/3

SAMSONOV, G.V., doktor tekhn. nauk

Materials for metal ducts of electromagnetic pumps. Mashinostroenie no.1:99-103 Ja-F '63. (MIRA 16:7)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.
(Pumping machinery)
(Metals at high temperatures)

S/279/63/000/001/015/023
E040/E451

AUTHORS: Neshpor, V.S., Samsonov, G.V. (Kiyev)

TITLE: Electrical and thermoelectrical properties of some transition metal silicides

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i gornoye delo, no.1, 1963, 147-151

TEXT: The effect was studied of temperature on the electrical resistance of $TiSi_2$, $ZrSi_2$, $NiSi_2$ and Ti_5Si_3 silicides and on the absolute differential thermoelectric potential of the $TiSi_2$, $ZrSi_2$, $NiSi_2$, $MoSi_2$, WSi_2, Mo_3Si, Mo_5Si_3 and CrSi silicides. The silicides were prepared by sintering silica (99.98% pure) with high purity metal powders by the method previously described by G.V.Samsonov et al (Ogneupory, no.2, 1958, 28: Zhrn.neorg. khimii, v.4, 1959, 2759). X-ray analysis of the silicides so prepared showed close agreement between the calculated and observed structures. Graphs of the variation of the electrical resistivity of $ZrSi_2$, $NiSi_2$, $TiSi_2$, Ti_5Si_3 with temperature showed a general increase with rising temperature; this variation is linear for

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the Ti_5Si_3 and $TiSi_2$ silicides from room temperature to about 800°C but for the silicides $ZrSi_2$ and $NiSi_2$ the relationship is linear only above 200°C. Differential thermal coefficients of resistivity were calculated for all the silicides investigated and their values compared with the corresponding Debye temperatures and elasticity moduli. The differential thermal coefficients of resistivity were plotted against the elasticity moduli of the various silicides and showed that they diminished with rising elasticity moduli, i.e. the rate of increase in resistivity diminishes with rising temperature. The nonlinear character of the thermoelectric potential vs. temperature curves of the silicides was not in accordance with the theory of metal structure. $TiSi_2$ and $NiSi_2$ silicides were found to be exceptions, their curves being almost linear. The signs of the thermoelectric potential at room temperature, of the thermo-emf derivative with respect to temperature ds/dt and of the Hall coefficient, of the silicides were compared and provided further proof of a previously postulated concept that the sign of a current carrier is defined by the sign of the derivative of the thermo-emf with

respect to temperature (which should be the same as the sign of Hall coefficient). Chromium silicide (CrSi) is an exception in this respect. Smidt's expression for the absolute differential thermo-emf is expanded to show that the absolute differential thermo-emf is independent of temperature in the case when the Fermi energy and the energy of the A band overlap vary linearly with temperature, as is illustrated by the $MoSi_2$ and WSi_2 silicides. There are 3 figures and 3 tables.

SUBMITTED: November 18, 1961

SAMSONOV, G. V.

AID Nr. 982-8 4 June

SINTERING OF NITRIDES OF TRANSITION METALS (USSR)

Samsonov, G. V., and T. S. Verkhoglyadova. Poroshkovaya metallurgiya, no. 2, Mar-Apr 1963, 8-13. S/226/63/000/002/001/014

In a search for an optimal method for manufacturing articles from Ti, Zr, Hf, V, Nb, Ta, Cr, and Mo nitrides, the Institute of Powder Metallurgy and Special Alloys, Academy of Sciences Ukrainian SSR, has studied vacuum sintering of green compacts, hot compacting of nitride powder in an Ar, N_2, or $CO+N_2$ atmosphere, and reaction sintering, i. e., nitriding of green-metal powder compacts. In vacuum sintering, green nitride compacts of stoichiometric composition (also with substoichiometric N content in the case of Ti), with a porosity of 40 to 60%, were held at temperatures up to 2200°C for 2 to 4 hrs. Nitrogen losses in sintering V and Ta nitrides were found to be rather low (0.1 to 3.3%). In Ti nitrides with a substoichiometric nitrogen content, the N content even slightly increased due, probably, to a partial evaporation of Ti. The residual

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AID Nr. 982-8 4 June

SINTERING OF NITRIDES (Cont.) S/226/63/000/002/001/014

porosity of sintered specimens, as a rule, increased with increasing nitrogen content but decreased with increasing temperature and duration of sintering. The Cr and Mo nitrides in vacuum lost considerable amounts of N and could not be sintered to a compact state. This is attributed to the low acceptor ability of d-levels of these metals and to the high ionization potential of nitrogen atoms. In hot compacting of nitride powders the density of homogeneous nitride phases increased with decreasing N content. Considerable change in the N content occurred in hot pressing of Ti nitrides, Nb_2N, TaN, and especially Cr and Mo nitrides. The last two again could not be obtained in compact form. The least changes in the chemical composition of nitrides, including the least contamination with carbon, occur in hot pressing in an Ar atmosphere. Reactive sintering which combines the formation and sintering of nitrides intensifies, in some cases, the shrinkage and increases the density of the products as compared with conventional methods of sintering green compacts. Reactive sintering makes it possible to obtain compact nitrides with a low residual porosity and low impurity content at considerably lower temperatures (700 to 1300° C) than those required by other processes. [MS]

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S/226/63/000/002/009/014
A006/A101

AUTHORS: Marchenko, V. I., Samsonov, G. V.

TITLE: Thermoelectric properties of lanthanum sesquisulfide

PERIODICAL: Poroshkovaya metallurgiya, no. 2, 1963, 60 - 64

TEXT: In previous investigations it was established that La_2S_3 is a semiconductor with 1.32 ev forbidden band width and transition to proper conductivity at about 700°C. The authors studied the temperature dependence of the thermo-emf coefficient in the range from 300 to 1,000°C. Thermo-emf was measured in a 10^{-2} mm Hg vacuum by the compensation method. The thermo-emf coefficient and the specific electric resistivity of La_2S_3 sulfide as functions of temperature are graphically represented. The temperature of transition from the proper to the extrinsic conductivity coincides with the thermo-emf temperature of inversed sign. The absolute value and the sign of the thermo-emf coefficient in the given temperature range depend on the correlation between concentration and carrier mobility. In the range of extrinsic conductivity (200 - 500°C) the coefficient of thermo-emf has a positive sign and decreases at higher temperatures. This

Thermoelectric properties of lanthanum sesquisulfide

proves that hole conductivity prevails in the given range. At higher temperature the mobility of vacancies decreases and entails a reduction in the coefficient of thermo-emf. This dependence is shown in formula

$$\alpha = 86 \left(\frac{\Delta E_n}{2kT} - 1.98 \right) [\mu v/\text{degree}]$$

Calculation and experimental data are compared. They differ at temperatures over 400°C (-17.5%). This difference is explained by the deviation of the ionization energy from the mean value 0.32 ev, and by the fact that the electron diffusion was not taken into account. The experimental results can be used to reveal the nature of conductivity, and for the practical application of new semiconductor compounds, as a means of controlling thermal processes in a vacuum, inert medium, molten metal medium, and as operational components of thermo-electric power transformers. There are 2 figures and 1 table.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Cermets and Special Alloys, AS UkrSSR)

SUBMITTED: January 12, 1963

Card 2/2

S/226/63/000/002/010/014
A006/A101

AUTHOR: Samsonov, G. V.

TITLE: Crystallochemical peculiarities of borides, nitrides, silicides and phosphides of transition metals

PERIODICAL: Poroshkovaya metallurgiya, no. 2, 1963, 65-79

TEXT: The author analyzes the correlation between the crystallochemical peculiarities, the physical properties and electron structure of the aforementioned compounds. The decisive factors are: the nature of filling the d-electron states of metal atoms, values of ionization potentials of metalloid atoms, and the ratio of the atomic dimensions of the components. Nitrides of titanium, zirconium, hafnium and vanadium with a limit N content, show mainly the features of metallic compounds; nitrides of molybdenum and tungsten show characteristics of ionic compounds; nitrides of niobium, tantalum and chromium are a combination of metallic and ionic bond with some prevalence of the latter. Borides of transition metals are characterized by separate boron atom configurations, which become more complex with a higher boron content in the borides. The formation

Card 1/3

of such structural elements is caused by the relatively low ionization potential of the boron atom (8.4 ev) and the formation of electron exchange between these atoms which is accompanied by the development of covalent bonds. In a number of structures, boron atom electrons are insufficient for the formation of covalent bonds, and electrons of metals are brought to participate. A CaB_6 type structure is a typical example. Boron plays a predominant part in the organization of a strong structural shell; metal atoms participate equally in the development of interatomic bonds, independent of their valence. The silicides of transition metals are compounds between carbides, nitrides and brodes, on the one hand, and intermetallic compounds on the other hand. The low ionization potential of Si causes the formation of structures with covalently connected configurations of silicon atoms. The silicides do not obey the Hagg's rule and do not represent interstitial phases but phases of substitution of metal atoms by silicon atoms. The phosphides of many transition metals have structures similar to metal structures; the distribution of electronic density, however, makes them less resistant thermally and thermodynamically. On the other hand, the relatively high atomic radius of phosphorus (1.10 Å) makes impossible the formation of plain interstitial structures in phosphides for the majority of metals. They are

classified into monophosphides of metals, obeying Hagg's conditions and having interstitial phase structures, and phosphides of transition metals which do not obey Hagg's condition. There are 5 tables and 12 figures.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Cermets and Special Alloys, AS UkrSSR)

SUBMITTED: April 14, 1962

L 15582-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD/JG

ACCESSION NR: AP3000907 S/0279/63/000/002/0096/0098

AUTHORS: Lamikhov, L. K. (Novosibirsk); Samsonov, G. V. (Kiev) 56

TITLE: Modification of Al by the transition metals 27

SOURCE: AN SSSR. Izv. otd. tekh. nauk. Metallurgiya i gornoye delo, no. 2, 1963, 96-98

TOPIC TAGS: inoculant, transition metal, Al, Ni, Co, Fe, Mn, Cr, Nb, Ta, W, Zr, V, Ti, grain refinement, concentration gradient, interparticle, crystallizing center

ABSTRACT: It is stated that the modifying effect of the transition metals, whether from the formation of crystallizing centers of interparticles or from concentration gradient, in the final analysis is determined by the activity, the reaction capacity of the transition metals, expressed by the degree of incompleteness of the d-electron shells in the atoms. To evaluate the effectiveness of inoculation with transition metals as compared with pure Al, data from M. D. Eborall (Grain refinement of aluminum and its alloys by small additions of other elements. J. Inst. Metals, 1949, 76, 295) were used. By assuming the effectiveness of the modifying action of titanium (as the strongest inoculant) to be 100% and the effectiveness of Mn, Fe, Co, Ni, and unrefined Al grains to be 0%, the dependence of this effectiveness on

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L 15582-63

ACCESSION NR: AP3000907

acceptor capacity of d-electron shells in atoms of the various transition metals may be shown graphically. These relationships are shown in Fig. 1 (Enclosure 1). It is thus seen that the transition metals with incomplete d-electron shells, possessing the greatest acceptor capacity, are the most effective inoculants of Al. The authors think this modifying effect to be due most likely to the formation of quasi-molecular atomic groups (more precisely — atomic frameworks) of transition metals and Al, similar to the grouping of iron and silicon atoms in iron-silicate alloys. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 18Oct62 DATE ACQ: 12Jun63 ENCL: 01

SUB CODE: ML NO REF SOV: 009 OTHER: 003

Card 2/3 2

The Second All-Union Conference on Rhenium, sponsored by the Institute of Metallurgy imeni A. A. Baykov, Academy of Sciences USSR, and the State Institute of Rare Metals, was held in Moscow 19-21 November 1962. A total of 335 representatives from 83 scientific institutions and industrial establishments participated. Among the reports presented were the following: autoclave extraction of Re from Cu concentrates (A. P. Zelikman and A. A. Peredereyev); Re extraction from the gaseous phase (V. P. Savrayev and N. L. Peysakhov); recovery of Re by sorption and ion interchange (V. I. Bibikova, V. V. Il'ichenko, K. B. Lebedev, G. Sh. Tyurekhodzhayeva, V. V. Yermilov, Ye. S. Raimbekov, and M. I. Filimonov); production of carbonyl Re (A. A. Ginzburg); electrolytic production of high-purity Re and electroplating with Re (Z. M. Sominskaya and A. A. Nikitina); Re coatings on refractory metals produced by thermal dissociation of Re chlorides (A. N. Zelikman and N. V. Baryshnikov); plastic deformation and thermomechanical treatment of Re (V. I. Karavaytsev and Yu. A. Sokolov); growth of Re single crystals and effect of O_2 on their properties (Ye. M. Savitskiy and G. Ye. Chuprikov); Re-Mo, Re-W, and Re—precious-metal alloys (Ye. M. Savitskiy, M. A. Tylkina, and K. B. Povarova); synthesis of Re nitrides, silicides, phosphides, and selenides (G. V. Samsonov, V. A. Obolonchik, and V. S. Neshpor); weldability of Re-Mo and Re-W alloys (V. V. D'yachenko, B. P. Morozov, and G. N. Klebanov); new fields of application for Re and Re alloys (M. A. Tylkina and Ye. M. Savitskiy); and Re-Mo alloy for thermocouples (S. K. Danishevskiy, Yu. A. Kocherzhinskiy, and G. B. Lapp).

Tsvetnyye metally, no. 4, Apr 1963, pp 92-93 [WW]

ACCESSION NR: AP4006583 S/0021/63/000/004/0463/0466

AUTHOR: Marchenko, V. Y.; Samsonov, G. V. (Corresponding member)

TITLE: Thermoelectric properties of Ce_2S_3

SOURCE: AN UkrRSR. Dopovidi, no. 4, 1963, 463-466

TOPIC TAGS: thermoelectric property, cerium sulfide, thermal emf

ABSTRACT: The temperature dependence of the thermal e.m.f. of a polycrystalline cerium sulfide, Ce_2S_3, was investigated, between 200 and 1000 C. This material is useful in that it is stable against high temperature oxidation in vacuum (10^{-2} to 10-3 Torr), and it is impervious to many modern metals, making it an excellent refractory. The results are shown graphically in Fig. 2 of Enclosure 01. In the region of extrinsic conductivity (100-600 C) the thermal e.m.f. is positive and changes in inverse proportion to the temperature, in accordance with the relationship established by N. L. Pisarenko (c. f. A. F. Loffe, Fizika Polvprovodnikov, Izd'vo AN USSR, 1957). The thermal e. m. f. changes sign between 700 and 800 C; about 800 C it increase in direct proportion to the temperature.

INST. METALLOCERAMICS AND SPECIAL ALLOYS — AN UKRSSR

Card 1/1

L'VOV, S.N.; NEMCHENKO, V.F.; SAMSONOV, G.V.

Physical properties of chromium borides, carbides, nitrides, and silicides. Izv. vys. ucheb. zav.; fiz. no.5:21-26 '63. (MIRA 16:12)

1. Khersonskiy pedagogicheskiy institut imeni N.K.Krupskoy i Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

PODERGIN, V.A.; SAMSONOV, G.V.

Aluminothermic reduction of lanthanum, cerium and praseodymium oxides. Izv. AN SSSR. Met. i gor. delo no.5:50-57 S-O '63.
(MIRA 16:11)

L 18556-63 EPR/EWT(1)/BDS AFFTC/ASD Ps-4 WW

ACCESSION NR: AP3004262 S/0131/63/000/007/0311/0312

AUTHOR: Samsonov, G. V.; Kisly*y, P. S.; Vlasov, K. R. 66

TITLE: Forming protective thermocouple caps

SOURCE: Ogneupory*, no. 7, 1963, 311-312

TOPIC TAGS: protective cap, thermocouple, press, carbide, boride, silicide, aluminum oxide, zirconium oxide

ABSTRACT: A press has been developed for forming one-piece protective caps for thermocouples used in steel and iron smelting. To form a cap, plastic material is placed in cylinder (5) (see Enclosure) and pressed with plunger (9) into the annulus between the centered hollow needle (4) and the interchangeable inset (2). The head of the cap is formed in the base (12). To allow for passing of air, a steel rod (8) is removed from the hollow needle. Using this press, the authors prepared protective caps of carbides, borides, silicides, aluminum oxide, and zirconium oxide. Orig. art. has: 1 diagram.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov, AN USSR (Institute of Metal Ceramics and Special Alloys, Academy of Sciences, Ukrainian SSR)

SUBMITTED:	00	DATE ACQ:	20Aug63	ENCL:	01
SUB CODE:	MA,ML	NO REF SOV:	001	OTHER:	000

Card 1/2

ACCESSION NR: AP4009737 S/0021/63/000/012/1609/1612

AUTHOR: Samsonov, G. V. (Corresponding member); Pod'orgin, V. A.

TITLE: Investigation of the reduction of lanthanum and cerium oxides by aluminum in a vacuum

SOURCE: AN UkrRSR. Dopovidi, no. 12, 1963, 1609-1612

TOPIC TAGS: La, Ce, La sub 2 O sub 3, lanthanum oxide, CeO sub 2, cerium oxide, reduction, rare-earth metal

ABSTRACT: The reduction was carried out in a vacuum of 10^{-4} mm Hg. The presences of Al_2O_3 at 1000-1500C and of Al_2O at 1500-1600C, reported by other investigators, were not confirmed by x-ray phase analysis of the reaction products. Chemical and x-ray analysis showed that the reduction occurs with the formation of AlO and intermediate reaction products in the form of aluminates and lower oxides of the rare-earth metals. Orig. art. has: 7 formulas, 2 figures, and 2 tables.

ASSOCIATION: Insty*tut metalokeramiky* i spetsial'ny*kh splaviv AN URSR (Institute of Cermets and Special Alloys AN URSR); Khimiko-metalurgiyny*y insty*tut SV AN SRSR (Chemicometallurgical Institute SV AN SRSR)

Card 1/2

PANASYUK, A.D.; SAMSONOV, G.V.

Thermocouples with electrodes from high-melting carbides for measuring temperatures up to 3000°C. Teplofiz. vys. temp. 1 no.1:136-140 Jl-Ag '63. (MIRA 16:10)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

LYU CHZHUN-KHUEY [Liu Chung-hui]; ROGINSKIY, S.Z.; SAMSONOV, G.V.; YANOVSKIY, M.I.

Dehydrogenation of n-butane to butenes and 1,3-butadiene on some chromium carbide. Neftekhimiia 3 no.6:845-849 N-D '63. (MIRA 17:3)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR i Institut khimicheskoy fiziki AN SSSR.

EWP(q)/EWT(m)/BDS--AFFTC/ASD--JD
L 11214-63
ACCESSION NR: AP3001629 S/0192/63/004/003/0395/0404 53
52

AUTHOR: Samsonov, G. V.

TITLE: Some crystallochemical peculiarities of phosphides

SOURCE: Zhurnal strukturnoy khimii, v. 4, no. 3, 1963, 395-404

TOPIC TAGS: crystallochemical peculiarities of phosphides, phosphide phases, preliminary structural classification, transition metals, non-transition metals, electron density, phosphide crystals.

ABSTRACT: Author examines the crystal structures of phosphide phases and suggests a preliminary structural classification of the phosphides of transition metals. An analysis of the data for the physical and thermal properties of the phosphides of transition and non-transition metals shows that the amount and nature of the change of these properties are determined by the type of distribution of the electron density in the phosphide crystals. Orig. art. has: 5 figures and 4 tables.

Inst. for Metallocer.-amic. + Special Alloys

Card 1/2

S/185/63/008/001/022/024
D234/D308

AUTHORS: Marchenko, V. Y. and Samsonov, G. V.

TITLE: Physical properties of cerium sulfides

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 8, no. 1, 1963, 140-142

TEXT: The authors heave measured the temperature dependence of electric resistance, thermal expansion (both at 20 - 1000°C) and magnetic susceptibility (at room temperature) of CeS and Ce_2S_3, and calculated their thermal coefficients of resistance and the width of the forbidden band. These data are plotted and tabulated. There are 2 figures and 1 table.

ASSOCIATION: Instytut metalokermiky i spetssplaviv AN URSR, Kiev (Institute of Metal Ceramics and Special Alloys, AS UkrSSR, Kiev)

SUBMITTED: September 26, 1962

Card 1/1

L 10023-63 EWG(k)/EWP(q)/EWT(l)/EWT(m)/BDS--AFFTC/ASD/ESD-3--Pz-4--
IJP(C)/AT/WH/JD/HW-2/JG

ACCESSION NR: AP3002126 S/0185/63/008/006/0700/0702

AUTHOR: Samsonov, H. V.; Fomenko, V. S.; Paderno, Yu. B.

TITLE: Thermionic emission properties of some refractory compounds

SOURCE: Ukrains'kyy fizychnyy zhurnal, v. 8, no. 6, 1963, 700-702

TOPIC TAGS: TuB (+TuB), ScB; HfC, NbC, TiN, ZrN, NbN, thermionic emission, work function, emissivity coefficient, emission current density

ABSTRACT: In a search for new materials for cathodes, an investigation has been conducted of the thermionic emission properties of TuB sub 6 (+TuB sub 2), [Tu is the Soviet symbol for thulium.] ScB sub 2, HfC, NbC, TiN, ZrN, and NbN compounds at temperatures ranging from 1000 to 2000K. The compounds tested were deposited in the form of a paste on Ta or W cathode filaments of diodes with triple tantalum anodes, evacuated to 10 sup -6 or 10 sup -7 mm Hg. The coated cathodes were from 0.8 to 1.2 mm thick. The experimental data showed the work function to vary from 3.25 ev for HfC at 1550K to 3.92 ev for NbN at 1950K; the respective emissivity coefficients (at A wavelength of Lambd = 0.65 micron)

Card 1/3

L 10023-63
ACCESSION NR: AP3002126

were 0.77 and 0.83. The saturation current density varied from 0.00024 amp/cm sup 2 for NbC at 1500K to 0.22 amp/cm sup 2 for TuB sub 6 (+TuB sub 4) at 1900K. The work function for TuB sub 6 (+TuB sub 4) were found to increase linearly from about 2.65 ev at 1050K to a maximum of about 3.9 ev at 1650K and then decrease with increasing temperature. The x-ray diffraction patterns revealed that at 1800K no phase transformations occurred in TiN coating on either a tantalum or tungsten core. In general, the emission current density of almost all the compounds in the temperature range investigated were not high. However, calculations showed that with a further increase in temperature the emission may increase sharply and, at temperatures of the order of 1900--2000C may reach several amp/cm sup 2. For carbides and nitrides with melting temperature of 2700--3000 and 2100--2200C, respectively, the calculated density of the emission current added up to tens of amperes per square centimeter. Hence, refractory compounds can be used advantageously as materials for cathodes where high operating temperatures are required and the intensity of their heating is not restricted. Orig. art. has: 1 figure and 2 tables.

ASSOCIATION: Insty*tut metalokeramiky* ta spetssplaviv AN URSR, Kiev (Institute of Powder Metallurgy and Special Alloys AN URSR)

Card 2/3

L 10023-63
ACCESSION NR: AP3002126

0

SUBMITTED: 20Nov62 DATE ACQ: 12Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 004 OTHER: 002

nh/ja

Card 3/3

L 10295-63 EWT(1)/EWG(k)/EWP(q)/EWT(m)/BDS/ES(w)-2--
AFFTC/ASD/ESD-3/SSD--Pz-4/Pab-4--AT/JD/IJP(C)/JG
ACCESSION NR: AP3001008 S/0109/63/008/006/1076/1081

AUTHOR: Marchenko, V. I.; Samsonov, G. V.; Fomenko, V. S. 77

TITLE: Thermionic emission of lanthanum and cerium sulfides

SOURCE: Radiotekhnika i elektronika, v. 8, no. 6, 1963, 1076-1081

TOPIC TAGS: thermionic emission, rare-earth compounds

ABSTRACT: Experimental investigation of thermionic emission of mono- and sesquisulfides of the above metals is reported. Specimens 0.6 - 0.8 -mm thick and 6-mm in diameter were subjected to electronic bombardment from a tungsten filament kept at 400 v; anode voltage was 600 v. Table 3 (see Enclosure 1) gives the results of the investigation: work-function values at 1200 and 1700K, its variation with temperature, and emission-current density at 1700K. The sulfides have a low emission-current density at medium through rather high temperatures: at 1700K, a few ma per cm sup 2. The temperature coefficient of work function, around (1-2) x x 10 sup -3, is characteristic for ionic compounds. "The authors express their gratitude to N. G. Ushakov for hooking up and pre-testing the experimental outfit." Orig. art. has: 5 figures and 3 tables.

Card 1/3

L 10657-63
EWP(q)/EWT(m)/BDS--AFFTC/ASD--JD

ACCESSION NR: AP3001212 S/0078/63/008/006/1320/1325

53
52

AUTHOR: Samsonov, G. V.

TITLE: The classification of hydrides

SOURCE: Zhurnal neorganicheskoy khimii, v. 8, no. 6, 1963, 1320-1325

TOPIC TAGS: classification of hydrides, classification of elements

ABSTRACT: The proposed classification is based on systems proposed by Kherd (Vvedenie v khimiya gidridov, M., I. L., 1955), Nekrasov (Kurs obshchey khimii, goskhimizdat, M., 1952), Mikheyeva (Gidridy* perekhodny*kh metallov, Izd-vo AN SSSR, M., 1960), and Galaktinonova (Vodorod v metallakh, Metallurgizdat, M., 1959), but is supplemented on the basis of donor-acceptor interaction in lattices of inorganic compounds. Based on electron structure and character of chemical bonds, the elements are divided into 4 groups: ionic hydrides including non transitional metals having outer s-electrons with 3-7 ev ionization potential; metal-like hydrides of d- and f-transition metals: covalent metal hydrides including non-transitional metals having outer s-electrons with 7-11 ev first ionization potentials; covalent hydrides including all transitional elements having outer p-electrons independent of the magnitude of ionization potentials. Orig. art. has:

Card 1/1, Dist. w/ Metalceramics + Special Alloys

L 18717-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD/JG

ACCESSION NR: AP3004360 S/0078/63/008/008/2009/2011

62
60

AUTHOR: Samsonov, G. V.; Sleptsov, V. M.

TITLE: Study of boron solubility in silicon

SOURCE: Zhurnal neorganicheskoy khimii, v. 8, no. 8, 1963, 2009-2011

TOPIC TAGS: boron, silicon, boron solubility, alloy, preparation, homogeneity, solubility, x-ray analysis, lattice constant, homogenizing

ABSTRACT: The solubility of boron in silicon at 25—1300C and the effect of homogenizing time (0.5—24 hr) on the homogeneity of the resulting alloys have been studied. Boron of 99.98% purity and single-crystal Si of 99.999% purity and having a resistivity of 1.4—1.6 ohm cm were used. Alloys containing 0.1—10 at% B were prepared by melting the materials at 1450C in an argon atmosphere, followed by homogenizing at 1000, 1100, 1200 and 1300C and final quenching in oil. Homogenizing was carried out under argon in a resistance furnace. A specially constructed apparatus was used for the heating and quenching operations. The homogeneity of the alloys was determined by x-ray and metallographic analysis. It was found that an equilibrium is reached after 2 hr of homogenizing; to ensure complete homogeneity, the alloys were homogenized for a total of 8 hr. To

Card 1/02

L 18717-63
ACCESSION NR: AP3004360

2

determine the solubility of B in Si at room temperature, samples were homogenized at 1300C for 8 hr, then gradually cooled in the furnace to 600C in 5 hr, and finally brought to room temperature. The lattice constants of Si were calculated from x-ray phase analysis data, with an error of ± 0.0002 Å, and are shown in Table 1 of the Enclosure. The solubility of B in Si, determined from a plot of lattice constant versus B content, is shown in Table 2. Lattice-constant measurements for alloys containing more than 5 at% B suggested that the solubility of B in Si at the eutectic point was about 3.6 at%. Orig. art. has: 2 figures and 2 tables.

ASSOCIATION: none

SUBMITTED: 03Feb62 DATE ACQ: 21Aug63 ENCL: 01

SUB CODE: CH, MA NO REF SOV: 002 OTHER: 003

Card 2/02

MARCHENKO, V.I.; SAMSONOV, G.V.

Properties of rare earth metal monosulfides. Zhur.neorg.khim. 8 no.9:2035-2037 S '63. (MIRA 16:10)

1. Institut metallokeramiki i spetssplavov AN UkrSSR.

L'VOV, S.N. [L'vov, S.M.]; NEMCHENKO, V.F. [Niemchenko, V.P.]; SAMSONOV, G.V. [Samsonov, H.V.]; VERKHOGLYADOVA, T.S. [Verkhohliadova, T.S.]

Semiconductor electroconductivity of refractory nitrides. Ukr. fiz. zhur. 8 no.12:1372-1377 D '63. (MIRA 17:4)

1. Khersonskiy pedagogicheskiy institut im. Krupskoy i Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

L 10403-63 EPF(c)/EPF(n)-2/EWT(m)/BDS--AFFTC/ASD/AFWL/SSD--Pr-4/Pu-4--
AR/JXT(EX)
ACCESSION NR: AP3002272 S/0089/63/014/006/0588/0590

AUTHOR: Samsonov, G. V. 19 65

TITLE: Correlation of the behavior of neutron-irradiated boron-containing phases with peculiarities in their crystalline structure

SOURCE: Atomnaya energiya, v. 14, no. 6, 1963, 588-590

TOPIC TAGS: boron, boron carbide, metal tetraborides, metal hexaborides, transition metal diborides, cermets, boron steel, degenerating absorbers, control rods, B sup 10 isotope, irradiation, thermal neutrons, helium, boron nitride, crystal structure, crystal-lattice stability, covalent-bond stability, boron-containing phases, boride phases

ABSTRACT: Radiation-induced changes previously observed in the thermomechanical properties of products such as cermets, steel, degenerating absorbers, and control rods containing B sup 10 are related to features of crystalline and electronic structure. Individual chemical phases composed of tridimensional boron skeletons (B proper, boron carbide, tetra- and hexaborides) are most

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L 10403-63
ACCESSION NR: AP3002272

sensitive to irradiation with thermal neutrons, while phases with alternating metal and boron atomic layers forming a hexegonal two-dimensional lattice (diborides) are most stable. The inherently greater stability of the MeB sub 2 structure is enhanced by the fact that liberation of helium between atomic layers is not accompanied by lattice deformation such as is caused by helium evolution from the skeleton-type configuration. The covalent bond contribution, which increases with an increase in boron content, leads to a decrease in the stability of irradiated borides. Niobium, tantalum, and chromium diborides should prove to be the most stable of the transition metal diborides, owing to the stability of the chemical bond between the atomic layers of boron and the metal. Boron nitride is also expected to exhibit a significant resistance to neutron irradiation. The behavior of materials with inclusions of boride phases is determined not only by the structure of these phases, but also by the nature of the matrix and the extent and characteristics of the phase boundaries, e.g., by the formation of helium bubbles along the boundary, after annealing of irradiated boron steel. It is concluded that a certain degree of correlation may be found between the structure or electronic configuration of boron compounds and their behavior during irradiation with thermal neutrons. Orig. art. has: 3 figures.

Card 2/3

L 10403-63
ACCESSION NR: AP3002272

0

ASSOCIATION: none

SUBMITTED: 15Feb62 DATE ACQ: 12Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 005 OTHER: 004

ja/sd

Card 3/3

SAMSONOV, G.V.

ACCESSION NR: AP3008085 S/0089/63/015/003/0266/0267

AUTHOR: none

TITLE: Seminar on refractory metals, compounds, and alloys [Kiev, April 1963]

SOURCE: Atomnaya energiya, v. 15, no. 3, 1963, 266-267

TOPIC TAGS: refractory metal, refractory compound, refractory alloy, electron structure, crystal structure, electron beam welding, physical property, vanadium, niobium, molybdenum, single crystal growth, tungsten, rhenium silicide, nonmagnetic zirconium base alloy, tantalum, nonmetallic element diffusion, heat conductivity, electric conductivity, thermal diffusivity

ABSTRACT: In April 1963, a seminar on the extraction, physical properties, and electron structure of refractory metals was held in Kiev under the sponsorship of the Institute of Powder Metallurgy and Special Alloys, Academy of Sciences, Ukrainian SSR. Approximately 300 representatives of scientific research institutes attended the

Card 1/11

ACCESSION NR: AP3008085

seminar. One hundred papers were presented. Among them were the following:

I. I. Kornilov. The interaction between refractory compounds involving the formation of binary, ternary, and multicomponent solid solutions.

G. V. Samsonov. Classification of hydrides, nitrides, and other compounds of nonmetals with elements of the periodic table.

V. N. Yeremenko, Z. I. Tolmachev. The relationship between some properties and the electron structure of transition metals and their interstitial phases.

G. V. Samsonov. The nature of the catalytic properties of transition metals.

I. A. Kedrinskiy, A. I. Avgustinnik, Ye. A. Berkman. Experimental data on the catalytic activity of refractory metal electrodes in electrochemical reactions.

Card 2/11

ACCESSION NR: AP3008085

S. A. Nemponov. Specific features of electron structure and certain properties of 1st, 2nd, and 3rd large-period refractory metals.

G. V. Samsonov, V. N. Paderno. Some laws governing melting temperatures and other physical properties of transition metals.

R. G. Avarbe. Thermodynamic stability of monocarbides of transition metals of subgroups 4, 5, and 6 and periodicity of the change in some of their properties.

V. K. Grigorovich. The relationship between NaCl- and NiAl-type crystal structures of transition metals and their electron structure.

N. M. Yakobi, V. A. Sinel'nikova, and others. Obtaining high-purity vanadium and niobium by electron-beam melting.

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